P150

EFFECT OF GLYCOSAMINE COMBINED WITH OMEGA-3 FATTY ACIDS ON THE DEVELOPMENT OF CANINE EXPERIMENTAL OSTEOARTHRITIS

LN Frost-Christensen[1], F Lafeber[2], SC Mastbergen[2], J Garssen[3,4], A Hartog[3], HAW Hazewinkel[1]
[1]Dept. of Clin. Sc. of Comp. Anim., Utrecht University; [2]Dept. of Rheum. & Clin. Immunol., Utrecht University; [3]Dept. of Pharm. and Pathophys., Utrecht University, Netherlands; [4]Numico Research, Wageningen, Netherlands

Osteoarthritis (OA) is a complex disease with large impact on the quality of life, for which there is no effective therapy. Alternatives for the traditional use of NSAIDs are sought; glucosamine and omega-3 fatty acids have shown potential to modify OA development. Glucosamine is used to decrease clinical symptoms of OA and to prevent/decrease cartilage damage; omega-3 fatty acids are claimed to be anti-inflammatory with a protective effect on cartilage *in vitro*. Thus far clinical trails have shown conflicting results.
Aim: To investigate the effects of the combination of 800 mg glucosamine-sulfate and 1800 mg omega-3 fatty acids (including 930 mg eicosapentaenoic acid (EPA) and 600 mg docosahexaenoic acid (DHA)) on the development of canine experimental OA.
Materials and methods: In a prospective, double-blind, placebo controlled study two groups of dogs, age (30.7 ± 1.3 months) and weight (24.8 ± 0.5 kg) matched (mean ± SEM), cartilage lesions were induced in one stifle joint by use of the groove model. Medication or placebo was given daily (p.o.) from 1 month before, till 3 months after surgery. At regular intervals gait analysis (force-plate) was performed, blood was collected for fatty acids analysis, radiographs were made and synovia was collected for prostaglandin E2 (PGE2) and nitric oxide analysis. Cartilage and synovial membrane with underlaying tissue of the experimental OA and controlateral control stifle joint were dissected immediately after sacrifice for macroscopy and microscopy and cartilage proteoglycan synthesis, retention, release and content was determined.
Results (mean ± SEM): The EPA and DHA % of the total free fatty acids in the medication group (2.23 ± 0.57%; 2.75 ± 0.47%) was significantly ($p<0.001$) higher than that in the placebo group (0.16 ± 0.1%; 0.42 ± 0.57%), respectively, during the post operative period. The proteoglycan content in the femoral condyles for the control and experimental OA stifle joint, respectively, was significantly ($p<0.03$) higher in the medication group (38.4 ± 1.2 mg/g; 31.5 ± 1.3 mg/g) than in the placebo group (33.6 ± 1.2 mg/g; 27.2 ± 0.9 mg/g). However, the decrease of the proteoglycan content between experimental OA and control joint was not significant different between the medication (6.9 ± 1.3 mg/g) and the placebo group (6.4 ± 1 mg/g). No significant difference was found between the medication and placebo group for any of the other parameters assessed.
Discussion and conclusion: Combined medication of glycosamine and omega-3 fatty acid during 4 months, starting 1 month before the induction of OA enhanced the proteoglycan content in the femoral condyles of the experimental OA and the contralateral control joint. However, this did not coincide with any other clinical, histological or biochemical effect in this prospective, well-controlled, sensitive canine model of OA.

P151

A RANDOMIZED, CONTROLLED TRIAL OF LAND BASED COMPARED WITH AQUATIC EXERCISES FOR KNEE OSTEOARTHRITIS

U Weile[1], H Lund[1], B Rostock[2], A Downey[2], EM Bartels[1], B Fredriksen[3], B Danneskiold-Samsøe[1], H Bliddal[1], R Christensen[1]
[1]The Parker Institute, Frederiksberg Hospital, Frederiksberg, Denmark; [2]Dept. of Physical Therapy, Frederiksberg Hospital, Frederiksberg, Denmark; [3]Dept. of Occupational Therapy, Frederiksberg Hospital, Frederiksberg, Denmark

Aim of Study: To compare in the treatment of knee osteoarthritis (OA) an aquatic with a land-based exercise program focusing on balance, strength, and function applying similar exercises considering the different media.
Methods: 79 patients (17 male and 62 female, mean age 68 years old)) with knee osteoarthritis were randomized into one of three groups: aquatic exercise (n=27), land-based exercise (n=25), or control (n=27). The intervention groups had two exercise sessions per week for eight weeks with a follow-up after 3 months. The outcome measures were static balance measured on a force plate, isokinetic muscle strength, KOOS questionnaire, Six Minutes Walk Test and pain measured on a VAS – scale. The measurements were performed by independent observers.
Results: Attendance was 92% in the aquatic group and 85% in the land group. Balance expressed as the sway velocity, was significantly lower in the aquatic group compared to the land-based group (0.7032 s vs. 0.8561 s, p=0.034). Balance expressed as a percent of maximal stability showed a significantly better stability in the aquatic exercise group compared to the control group (79,6% vs. 76.6%, p=0.030). No significant differences between groups were observed for Six minutes walk test, muscle strength, self-reported daily symptoms, pain, daily function, sports activities, or quality of life (measured as KOOS). At follow-up, a significant reduction in pain at rest was observed in the land-based exercise group compared to the control group (11.2 mm vs. -8.3 mm, p=0,039). The aquatic exercise group improved their grip strength compared to the control group. A highly significant difference in adverse effects was observed between the aquatic and land-based exercise, i.e. 14 participants reported adverse effect in land-based exercise while only 3 reported adverse effect in aquatic exercise group (p=0.0002).
Conclusions: Exercising in water is superior to a land based program concerning balance and grip strength. Adverse events are significantly more frequent with the land-based program compared to the aquatic exercises. However, no effect on daily function or pain was observed in either of the groups.

P152

EFFECT OF CHONDROITIN SULFATE ON HYALURONAN SYNTHESIS AND EXPRESSION OF UDP-GLUCOSE DEHYDROGENASE AND HYALURONAN SYNTHASES IN SYNOVIOCYTES AND ARTICULAR CHONDROCYTES

M Raoudi[1], K Boumediene[1], R Roche[2], S Leclercq[3], JP Pujol[1]
[1]Laboratory of Connective Tissue Biochemistry, Faculty of Medicine, Caen, France; [2]Pierre Fabre Laboratories, 29 Av. du Sidobre, Castres, France; [3]Department of Orthopedic Surgery, Clinique St Martin, Caen, France

Aim: To investigate the production of hyaluronate (HA) and the expression of key-enzymes of HA synthesis in cultures of synoviocytes and chondrocytes treated with avian chondroitin sulfate (CS) and interleukin-1β (IL-1β).
Methods: Samples of human osteoarthritic articular cartilage and synovial membrane were obtained from patients undergoing

hip arthroplasty. Cells were cultured in DMEM with 10% FCS containing CS (1-100 μg/ml) with medium change every 2 days. After 4 days, culture medium was replaced with serum free DMEM containing 1% ITS with or without IL-1β (1 ng/ml) and then, the incubation was further continued for 24 or 48 h. At the end of experiments, culture medium was harvested for HA assay, using an ELISA-like method. RNA was isolated and reverse transcribed to cDNA, which was then subjected to the relative quantitative real-time PCR (Q-RT-PCR) procedure, using the ABI PRISM 7000 and SYBR green detection and specific primers for hyaluronan synthases (HAS) 1, 2 and 3 and UDP-glucose dehydrogenase (UGDH). RT-PCR data were normalized with GAPDH mRNA and gene expression relative to control was calculated with the delta delta cycle to threshold (ddCt) method.

Results: IL-1β was found to dramatically increase HA production by synoviocytes and articular chondrocytes. CS stimulated HA production by these cells, in a dose and time dependent manner. The effect of CS was observed for both basal and IL-1β induced HA levels. The cytokine increased mRNA expression of HAS1 and HAS2 in the two cell types, with greater effect on HAS1 than HAS2 whereas CS induced equivalent stimulation on both genes. As for HA production, the effect of CS on HAS1 and HAS2 expression was observed for basal and IL-1β induced expression. UGDH expression was stimulated by IL-1β in chondrocytes only. CS stimulated basal and IL-1β induced mRNA expression of UGDH in both synoviocytes and chondrocytes. Expression of HAS3, rather implicated in synthesis of low molecular HA species, was found to be stimulated by IL-1β in the two articular cells. Interestingly, CS inhibited HAS3 expression and repressed the IL-1β induced stimulation of this gene in chondrocytes. Work is in progress to determine the molecular size of HA produced in these experimental conditions.

Conclusion: CS enhanced HA production by articular cells. The effect is associated with concomitant increase of UGDH, HAS1 and HAS2 mRNA expression. In contrast, the expression of HAS3, the enzyme involved in synthesis of low molecular forms of HA is depressed by CS. These findings suggest that CS could exert its beneficial effect on OA symptoms through increased HA release in the synovial fluid and enhanced aggregating potential for cartilage proteoglycans.

P153

HYALURONAN VS. STEROID INJECTION FOR SUBACROMIAL IMPINGEMENT OF THE SHOULDER

L Funk
Orthopaedic Surgery, Hope Hospital, Manchester, Lancashire, United Kingdom

Aim: The aim of this study was to compare a synthetic Hyaluronan (OstenilP^{TMP}) to a corticosteroid injection (Depomedrone) for primary subacromial impingement of the shoulder.

Methods: In a retrospective review, thirty one patients with primary subacromial impingement of the shoulder were randomly given either a 40mg Depomedrone injection or Ostenil injection. No patients had undergone previous surgery. All had physiotherapy following the injection. Patients were given a Pain Diary with a ten point visual analogue scale to complete.

Results: There was no difference between the two groups with regard to age and sex.

Both steroid and Ostenil reduce the pain score in the first two to four hours post-injection, but in the Depomedrone group the pain score increases significantly from 12 hours to 2 days post-injection. This effect is not observed with Ostenil. This difference is significant ($p<0.05$) between 18 hours and 3 days post-injection. From 4 days the pain score is similar, with an equal reduction in pain in the two groups.

Conclusions: Ostenil Hyaluronan appears to be as effective as Depomedrone in reducing subacromial impingement pain, but does not produce the pain surge associated with Depomedrone in the first few days post-injection.

P154

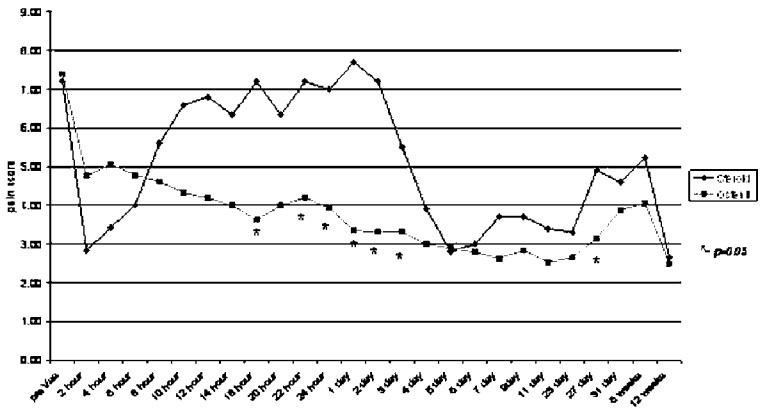
CONSTRUCT VALIDITY OF THE FUNCTION SECTION OF THE WOMACQUESTIONNAIRE: THE ARTHRIX SURVEY

F Rannou[1], S Poiraudeau[1], F Coriat[2], M Kabir[2], P Bertin[3], P Sichere[4], A Serrie[5], S Perrot[6]
[1]Service de Medecine Physique, Hopital Cochin, AP-HP, Université Paris 5, Paris, France; [2]Lab. Sanofi-Aventis, Paris, France; [3]Service de Rhumatologie, CHU Dupuytren, Limoges, France; [4]Rheumatologist, Paris, France; [5]Centre de la Douleur, Hopital Lariboisier, AP-HP, Paris, France; [6]Service de Medecine Interne, Hotel Dieu, Ap-HP, University Paris 5, Paris, France

Background: The WOMAC questionnaire has three sections: pain, stiffness, and function. The original function section (section C) has 17 items but shortened versions with eight and nine items have recently been proposed.

Aims: To assess and compare construct validity of the 17, nine, and 8eight-item versions of the WOMAC questionnaire.

Methods: In a cross sectional national survey, 1811 GPs enrolled 5324 patients with hip and/or knee osteoarthritis (OA). Pain at rest and during activities, and mean pain for the previous eight days were recorded on a 11-point numeric scale, and function was assessed using the 17, nine, and eight item-versions of the WOMAC, section C. Construct validity was assessed using the Chronbach coefficient, and factor analysis followed by orthogonal rotation. Coefficient correlations between mean scores were determined with Spearman's rank correlation coefficient.



Abstract P153 – Fig. 1. Mean VAS scores over time.